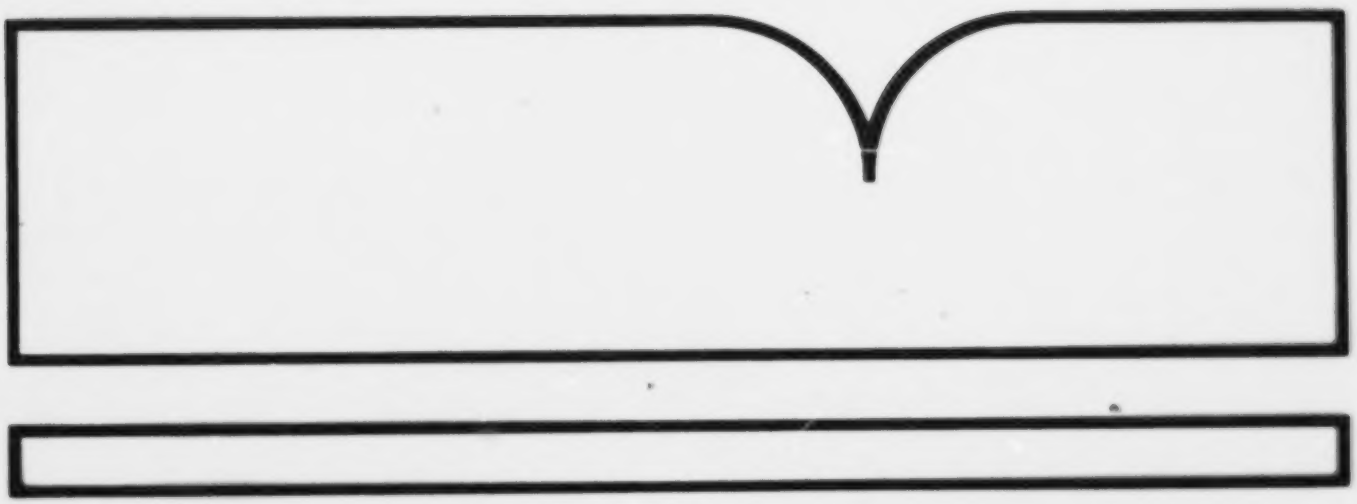
PB89-135354

Superfund Record of Decision (EPA Region 5) South Andover Site, Andover, Minnesota (First Remedial Action), March 1988

(U.S.) Environmental Protection Agency
Washington, DC

30 Mar 88



U.S. Department of Commerce
National Technical Information Service
NTIS

United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R05-88/065
March1988

PB89-135354

EPA

Superfund Record of Decision:

South Andover, MN

REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL INFORMATION SERVICE
SPRINGFIELD, VA. 22161

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/ROD/R05-88/065	2.	3. Recipient's Accession No.

4. Title and Subtitle
SUPERFUND RECORD OF DECISION
South Andover, MN
First Remedial Action
Author(s)

5. Report Date
03/30/88

6.

8. Performing Organization Rept. No

9. Performing Organization Name and Address

10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.
(C)
(G)

12. Sponsoring Organization Name and Address
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

13. Type of Report & Period Covered
800/000

14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

The South Andover site is comprised of several separate parcels of land totaling approximately 50 acres in the southern portion of Andover, Minnesota. One-quarter mile to the north of the site is a residential neighborhood. Further development is planned to the west and the south of the site. A large portion of the site is buried under a pile of tires and miscellaneous junk. Several smaller pieces of property on the site are auto salvage yards. The Waste Disposal Engineering landfill, a Superfund National Priorities List site, is located 3,000 feet northeast of South Andover. Multiple waste handling operations occurred between 1954 and 1981 on several properties within the site boundaries. Consequently, there are multiple source areas which include a drum storage area, a waste discharge area, and a waste burning area. In 1976, citizen complaints of well contamination prompted the Minnesota Pollution Control Agency (MPCA) to investigate the site and issue a Citation of Violation for the storage of chemical waste. Waste processing was discontinued in early 1977, and waste acceptance ceased in 1978. In 1980, the MPCA issued Notices of Violation for improper disposal of industrial wastes. In 1981, the contents of approximately 700 drums were disposed of by mixing them with waste oil and using the mixture as fuel. In 1986, a group of PRPs removed approximately 500 additional onsite drums. Soil investigations have been limited by the presence of a
(See Attached Sheet)

17. Document Analysis a. Descriptors

Record of Decision
South Andover, MN
First Remedial Action
Contaminated Media: gw
Key Contaminants: metals (arsenic, chromium, lead), organics, VOCs (PCE, TCE, Toluene)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement

19. Security Class (This Report)	21. No. of Pages
None	25
20. Security Class (This Page)	22. Price
None	

(See ANSI-Z39.18) See Instructions on Reverse

OPTIONAL FORM 272 4-77
(Formerly NTIS-35)
Department of Commerce

EPA/ROD/R05-88/065
South Andover, MN
First Remedial Action

16. ABSTRACT (continued)

large volume of tires piled onsite and piles of junked automobiles. The majority of the tires are currently being shredded and removed from the site. A subsequent RI/FS for soils and the lower sand aquifer is planned following tire removal. Currently, the primary contaminants of concern affecting the ground water include: arsenic, chromium, lead, metals, VOCs, PCE, TCE, toluene, and organics.

The selected remedial action for this site includes: continuous ground water extraction; provision of municipal water to private well users on or near the site; ground water monitoring; and placement of restrictions on new wells on or near the site. The present worth cost for this remedial action ranges from $920,000 to $2,460,000 depending on the discharge option selected. Present worth O&M ranges from $21,000 to $140,000.

N O T I C E

THIS DOCUMENT HAS BEEN REPRODUCED FROM THE BEST COPY FURNISHED US BY THE SPONSORING AGENCY. ALTHOUGH IT IS RECOGNIZED THAT CERTAIN PORTIONS ARE ILLEGIBLE, IT IS BEING RELEASED IN THE INTEREST OF MAKING AVAILABLE AS MUCH INFORMATION AS POSSIBLE.

RECORD OF DECISION
INITIAL GROUNDWATER OPERABLE UNIT

SITE NAME AND LOCATION

South Andover
Andover, Minnesota

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the South Andover site developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 and consistent with the National Oil and Hazardous Substances Pollution Contingency Plan to the extent practicable.

This decision is based upon the contents of the administrative record for the South Andover site.

The State of Minnesota concurs with the selected remedy.

DESCRIPTION OF THE REMEDY

This initial groundwater operable unit was developed to protect public health and the environment by controlling the migration of contaminants present in the surficial aquifer. The operable unit is fully consistent with all planned future site activities. Future site activities include locating contaminant source areas and developing the overall site remedy.

The major components of the selected remedy are as follows:

- Extract groundwater from the surficial aquifer;
- Provide municipal water to private well users on or near the site;
- Monitor groundwater movement at the site; and
- Place restrictions on new wells on or near the site.

DECLARATION

The selected remedy is protective of human health and the environment, will attain the applicable or relevant and appropriate requirements of other Federal and State environmental laws and is cost effective.

This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this action. However, because this action will not difinitively address any potential contaminant

source areas, due to its limited scope of migration control, this remedy does not satisfy the statutory preference for treatment as a principal element. Subsequent actions are planned for the site that will address all remaining concerns.

3/30/88
Date

Valdas V. Adamkus
Regional Administrator

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION
SOUTH ANDOVER SITE
GROUNDWATER OPERABLE UNIT

SITE LOCATION AND DESCRIPTION

The South Andover site is located in the southern portion of Andover, Minnesota, approximately 16 miles north - northeast of Minneapolis. The site is located in the southern half of Section 34 of Grow Township (T.32N., R.24W.). The South Andover site vicinity is shown in Figure 1.

A residential neighborhood exists 1/4 mile north of the site. Development is currently planned to the west and the south of the site. Bunker Lake Boulevard borders the site on the north, and Jay Street on the east. Small businesses along both roads deal in used cars, auto parts, and auto salvage. Several pieces of property within the site are auto salvage yards, and a large portion of the site is buried under a pile of tires and miscellaneous junk. The Waste Disposal Engineering landfill (WDE), which previously accepted hazardous waste, is located 3,000 feet northeast of the site. WDE is a National Priorities List site which is undergoing remedial design.

The site is comprised of several separate parcels of land totaling approximately 50 acres. Various independent storage and disposal activities took place on the site. The parcels of land are shown in Figure 2. The waste storage and disposal activities are detailed in Table 1.

SITE HISTORY

Industrial waste handling activities at the South Andover site are reported to have begun in 1954 with the storage of solvents and inks on the Cecil Heidelberger property. Open pit burning of liquid wastes began on the Batson property in 1970. Chemical waste storage began at the Mistelske property in 1973.

Actions to limit the waste handlers at the various properties began in 1973 when Anoka County officials instructed Cecil Heidelberger to remove and dispose of the chemical wastes stored on the property. Citizen complaints of well contamination prompted investigations by the Minnesota Pollution Control Agency (MPCA). MPCA issued a Citation of Violation to Cecil and Marion Heidelberger in 1976 for the storage of chemical waste. The Heidelbergers discontinued processing waste in early 1977 and stopped accepting waste in 1978.

Actions to regulate other waste handlers at the site occurred in 1980. Notices of Violation were issued by the MPCA to Shirley Heidelberger, Cyril Link, and Charles Mistelske for improper disposal of industrial wastes.

FIGURE 1
LOCATION OF SOUTH ANDOVER SITE
SOUTH ANDOVER

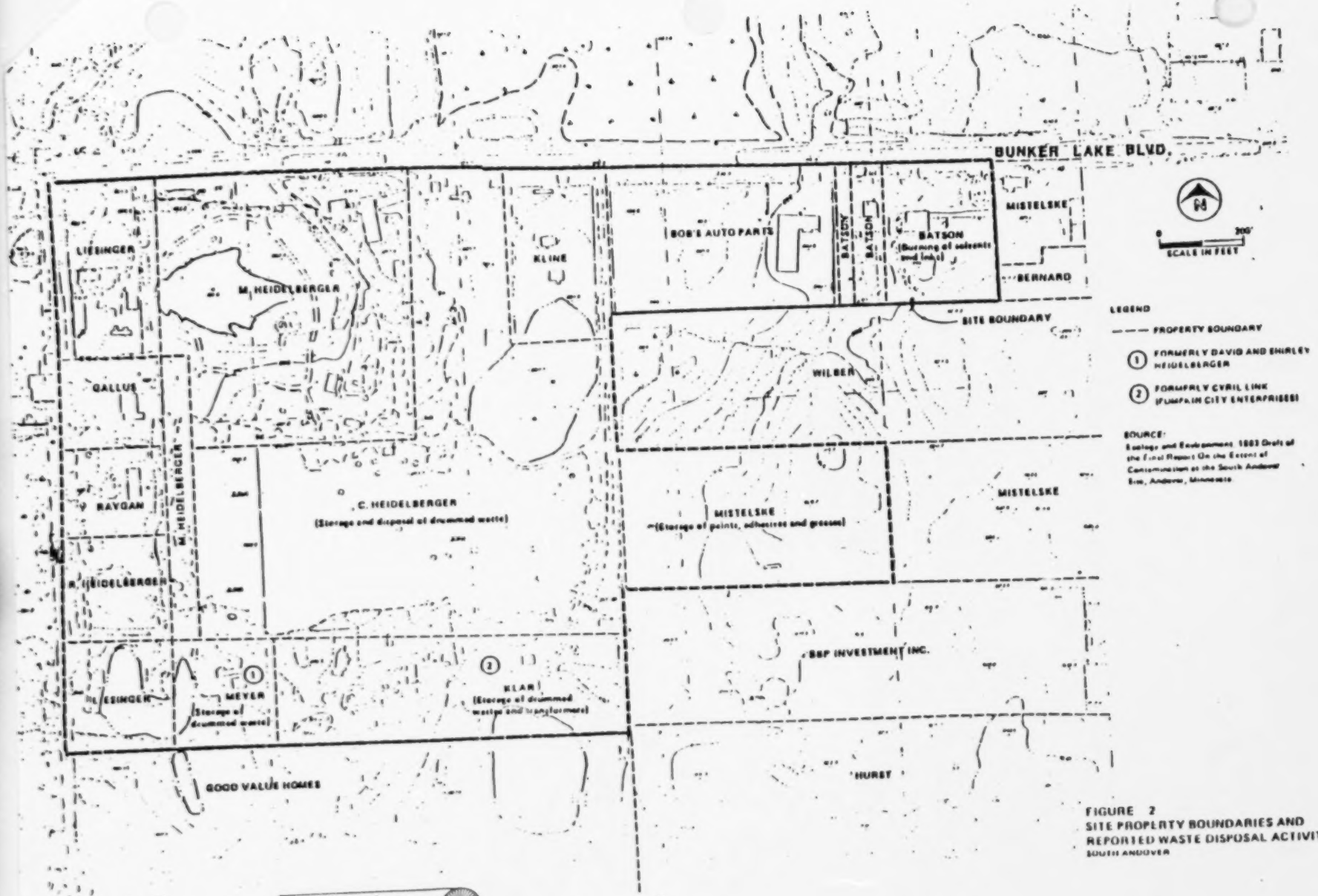


FIGURE 2
SITE PROPERTY BOUNDARIES AND REPORTED WASTE DISPOSAL ACTIVITI
SOUTH ANDOVER

Reproduced from best available copy.

TABLE 1

WASTE LOCATION AND DISPOSAL ACTIVITY

LOCATION	DISPOSAL ACTIVITY
Cecil Heidelberger Property	Chemical wastes were stored and disposed of on the property. A majority of the property is covered with tires and other debris.
Batson Property	Thousands of barrels of solvents and inks were allegedly burned in open pits. A wetland on the property was used as a disposal area prior to filling.
Charles Mistelske Property	The property was used to store approximately 8,300 gallons of paints, adhesives and greases in 1-,2-, and 55-gallon containers.
Meyer Property	The property was used to store approximately 200 drums of chemical waste. Spillage of chemical waste is known to have occurred.
Klar Property	Storage of drummed waste and transformers occurred on the property. An inactive smelting plant, empty drums and miscellaneous debris are present on the site.

Cecil Heidelberger disposed of the contents of approximately 700 drums in 1981 by mixing the contents with waste oil and using the mixture as fuel in an asphalt plant. Approximately 500 additional drums were removed in 1986 by a group of potentially responsible parties (PRPs). Some drums remain onsite.

Several site investigations have been performed at the site. An initial appraisal was performed by Residual Management Technologies (RMT) and PEDCo Environmental in 1979 at the request of U.S. EPA. A follow-up investigation by RMT/PEDCo in 1981 included the installation of 22 monitoring wells. Ecology & Environment, Inc. (E&E) installed 26 additional wells and 22 piezometers in 1981 as part of an expanded FIT groundwater investigation.

An initial remedial investigation (RI), completed January 29, 1988, was performed at the site to characterize the nature and extent of contamination. Soil investigations were limited by the presence of a large volume of tires piled onsite and piles of junked automobiles at various auto salvage yards onsite. The tires on the Cecil Heidelberger property, the majority of the tires, are currently being shredded and removed from the site under a grant from the Minnesota Waste Management Board. The tire removal is scheduled to be completed by Spring 1989. A subsequent RI, looking at contamination of site soils and possible contamination of the lower sand aquifer, is planned for the site following the tire removal.

A feasibility study (FS), completed January 29, 1988, was developed in conjunction with the RI. The FS looked at a variety of alternatives for dealing with the groundwater problem. The alternatives ranged from no action to complete lateral containment of the surficial aquifer with groundwater extraction.

ENFORCEMENT HISTORY

Sixteen parties were notified, by a March 15, 1982 letter from U.S.EPA's Office of Enforcement and Compliance Monitoring (OECM) in Washington, that the U.S. EPA was considering spending public funds at the South Andover site and that they may be liable for money expended by the government. These parties included site owners, site operators and waste generators.

In a July 30, 1985 letter from U.S. EPA Region V, 21 PRPs were notified that U.S. EPA planned to conduct an RI/FS at the site, and that the U.S. EPA would consider an offer by the PRPs to conduct the RI/FS. None of the PRPs indicated that they had the desire and ability to conduct the RI/FS. Negotiations were terminated in an August 29, 1985 memorandum, and the Superfund was used to conduct the RI/FS.

Copies of the Proposed Plan for this operable unit were sent to the PRPs on February 1, 1988. In a February 26, 1988 letter from U.S. EPA Region V, 21 PRPs were notified that the U.S. EPA intended to conduct a remedial action at the site and that the PRPs had 60 days to submit a good faith proposal. No response has been received as of this date.

COMMUNITY RELATIONS HISTORY

Community relations activities at the South Andover site have been handled with direct involvement from the U.S. EPA and the MPCA. The initial contact with the public was in the form of interviews with representatives of the City of Andover, City of Coon Rapids and property owners on or near the site.

Two public meetings have been held for the site. The first meeting was held on September 25, 1985 prior to initiating field activities. The second meeting was held on February 8, 1988 to answer questions and receive comments on this initial groundwater operable unit.

Public involvement and participation on the site has been limited to date. Representatives of the City of Andover and Anoka County have asked for greater involvement. There is a strong interest from these local bodies to facilitate development of the site and the surrounding area. Concern has also been expressed regarding the impact of this site when combined with the presence and remedial actions planned for the WDE site.

SCOPE OF OPERABLE UNIT

This response action is an initial groundwater operable unit and is consistent with Section 300.68(c) of the National Contingency Plan (NCP). This initial groundwater operable unit is being implemented to protect public health and the environment by controlling the migration of contaminated groundwater. The operable unit addresses known areas of groundwater contamination in the surficial aquifer. The U.S. EPA and MPCA feel the possible migration of contaminants from the surficial aquifer off the site or into the lower aquifer are the major concern posed by the site. This operable unit was initiated to deal with these concerns.

The operable unit is fully consistent with all future site work, including the subsequent RI/FS planned for Spring 1989. In addition, it is believed that the gradients established by the extraction well system may be beneficial to the subsequent RI by aiding in the location of "hot spots" which have not been detected. The extraction well system will be incorporated into any subsequent remedial action decisions at the site.

It was determined that the soils do not pose a risk which needs to be addressed as part of the present operable unit. A subsequent RI/FS is

planned for the site following the tire removal presently scheduled to be completed by Spring 1989. Because the soil investigation has not been completed, it was determined that soil removal or capping at the present time could interfere with the subsequent RI/FS, may not be consistent with the final remedy and may not be cost effective. For these reasons, an interim soil remedy was determined to be unnecessary and inappropriate at the present time.

SITE CHARACTERISTICS

The initial RI focused on the surficial aquifer and portions of the site which were clear of tires and other debris. The results of the RI can be broken down into three areas: 1) groundwater, 2) soils, and 3) surface water and sediments.

Multiple waste handling operations occurred between 1954 and 1981 on several different properties within the general site boundaries. Because of this, there is not one source area, but multiple source areas which include locations where drums were stored, where wastes were discharged to the ground, and where wastes were allegedly burned.

As a part of the initial RI, potential risks from contaminated groundwater and exposed soil locations on the site were calculated based on present site use conditions and on possible future residential or commercial development conditions. Both carcinogenic and noncarcinogenic risks were calculated. Risks were not calculated for surface water and sediment locations at this time, but will be included in the subsequent RI.

The carcinogenic risks are theoretical quantifications, and are reported as excess lifetime cancer risks. Excess lifetime cancer risk is defined as the incremental increase in the probability of getting cancer compared to the probability if no exposure occurred. For example, a $1x10^{-6}$ excess lifetime cancer risk represents an exposure that could result in one extra cancer case per million people exposed. Noncarcinogenic risks are determined by comparing potential doses of contaminants by site visitors to contaminant specific reference doses. The reference dose is an estimate of an exposure level that would not be expected to cause adverse effects when exposure occurs.

The analytical results from the remedial investigation and the risk assessment can be found in the RI Report for the South Andover site completed January 29, 1988. A brief summary of the results is presented below.

Groundwater Contamination

The site is underlain by a surficial sand aquifer, a middle aquitard, a lower sand aquifer, a till unit and a bedrock aquifer. The lateral flow in the surficial aquifer was found to radiate in a generally westwardly

direction from the eastern portion of the site. Water level measurements in the well nests indicate a dominant downward component of flow in both the surficial aquifer and the middle aquitard. Residence time of groundwater in the surficial aquifer and the aquitard are less than 10 years and 28 to 70 years respectively. The potentiometric surface of the lower sand aquifer indicates lateral flow southwest across the site.

Groundwater samples were collected from 50 monitoring wells and 8 residential wells on or near the site. Elevated levels of a number of organic and inorganic compounds were detected in shallow monitor wells on site. The highest detected contaminant concentrations are shown in Table 2. Only one contaminant was detected in the lower sand aquifer, and it was only detected in one well which contained 97 ppb methylene chloride. The methylene chloride may be a lab contaminant as opposed to actually being present in the well. Additional RI work is planned for the lower sand aquifer. Residential well sampling by Anoka County and the MPCA indicated that one residential well on-site, which was drawing from the surficial aquifer, was found to be contaminated. This well was ordered to be abandoned by the MPCA.

The contaminants are found in zones of discrete contamination rather than in a continuous plume. This is indicative of the multiple waste handling and disposal operations which occurred on the site.

The contaminated surficial aquifer exceeds a number of maximum contaminant levels as set by the Safe Drinking Water Act and pose incremental cancer risks of greater than $1x10^{-6}$. The groundwater does not pose an imminent risk to the population because the upper aquifer is not currently used as a source of drinking water on or near the site. However, because there is a downward gradient through the aquifer separating the upper and lower sand aquifers, the upper sand aquifer is a possible source of contamination to the lower sand aquifer which serves as a regional drinking water source. There is a potential for an increase in the incremental cancer risk of greater than $1x10^{-6}$ if wells are set in the upper aquifer as a result of future development of the site or if the lower aquifer becomes contaminated. In addition to the cancer risk, use of the contaminated groundwater would exceed the reference dose for bis(2-ethylhexyl)phthalate and acetone.

Soil Contamination

A complete surface and subsurface soil characterization could not be performed at the site due to the presence of the large volume of tires and three active auto junk yards. A limited soil sampling was performed during the RI concentrating on suspected waste storage and disposal areas which were not buried under tires or automobiles.

The soil samples indicated elevated levels of organics and inorganics. For the most part, each contaminant was found at low levels and in a limited number of locations. Under current land use the incremental

TABLE 2

CONTAMINANT LEVELS AND STANDARDS

COMPOUND	HIGHEST DETECTED GROUNDWATER CONCENTRATION (ug/l)	COON CREEK 30-DAY AV. DISCHARGE LIMITS (ug/l) (e)	GROUNDWATER DRINKING WATER STANDARDS (ug/l)	POTW DISCHARGE LIMITS (ug/l)
1,1,1-Trichloroethane	330	830	200 (a)	5000 (f)
1,1,2-Trichloroethane	37	900	6.11 (b)	5000 (f)
1,1-Dichloroethane	12	-	-	10,000 (f)
1,2-Dichloroethane	2	2140	3.8 (b)	15,000 (f)
1,1-Dichloroethene	20	-	-	10,000 (f)
1,2-Dichloroethylene	9	1880	70 (a,b)	10,000 (f)
2-Hexanone	75	-	-	15,000 (e)
4-Methyl-2-Pentanone	18	16,970	-	15,000 (e)
Acetone	170,000	1,270,000	-	15,000 (e)
Chlorobenzene	4	200	60 (b)	1000 (f)
Ethylbenzene	18	2410	680 (a,b)	10,000 (f)
Methylene Chloride	1600	6430	350 (c)	15,000 (e)
Tetrachloroethylene	20	150	6.9 (b)	10,000 (f)
Toluene	3200	1010	2000 (a,b)	15,000 (e)
Trichloroethylene	3	1360	5 (a)	10,000 (f)
Vinyl Chloride	12	86	0.15 (b)	15,000 (e)
Xylenes	22	320	440 (a,b)	15,000 (e)
Benzoic Acid	7	-	-	15,000 (e)
Bis(2-Ethylhexyl)Phthalate	2200	10	21,000 (d)	10,000 (f)
Diethyl Phthalate	1	4340	434,000 (d)	10,000 (f)
Di-n-butyl Phthalate	24	-	-	10,000 (f)
Di-n-octyl Phthalate	3	-	-	15,000 (e)
Isophorone	25	9750	5200 (d)	15,000 (e)
2-Methyl Phenol	21	-	-	15,000 (e)
4-Methyl Phenol	56	-	-	15,000 (e)
N-Nitrosodiphenylamine	6	10	71.1 (b)	10,000 (f)
Phenol	6	2550	280 (c)	15,000 (e)
Arsenic	17	400	50 (a,b)	100 (f)
Cadmium	256	-	5 (b)	1000 (f)
Chromium	127	-	120 (b)	10,000 (f)
Copper	673	-	1300 (b)	8000 (f)
Lead	23	220	20 (a,b)	100 (f)
Nickel	168	2720	150 (b)	1000 (f)
Zinc	8120	3060	-	30 (f)

(a) Based on Federal Safe Drinking Water Act Primary Maximum Contaminant Level

(b) Based on State of Minnesota Recommended Allowable Drinking Water Limits

(c) Based on Federal Office of Drinking Water Health Advisories (Relative Source Contribution) for long-term exposure (to be considered only)

(d) Based on Federal Clean Water Act Water Quality Criteria for Human Health adjusted for Toxicity Protection (to be considered only).

(e) Based on MPCA Division of Water Quality proposed effluent limitation

(f) Based on Threshold in inhibitory effect for activated sludge plants . U.S.EPA/530-SW-86-004 (to be considered only).

cancer risk posed by the soils is less than $1x10^{-6}$. The levels of lead in three of the soil samples could result in lead intakes which exceed the reference dose. Under future residential or commercial development, the cancer risk would exceed $1x10^{-6}$. Future use scenarios of light commercial/industrial development and residential development had incremental cancer risks of $4x10^{-5}$ and $1x10^{-4}$ respectively. Under both of these development scenarios, three soil samples had lead levels which could result in intakes of lead greater than the reference dose.

Surface Water and Sediment Contamination

Six surface water and sediment samples were collected from ponded water locations on the site. No pesticides or volatile organic compounds were found in any of the samples. Phenol phthalates and benzoic acid were detected in the samples. Naphthalene was detected in one sample. Elevated levels of inorganics were also detected.

The surface water bodies are not used for drinking water or recreation. Therefore, the surface water and sediments were not dealt with at this time. They will be considered during the overall site RI/FS.

ALTERNATIVES EVALUATION

The major objective of the feasibility study (FS) was to evaluate the need for an initial groundwater measure and possible actions which could be undertaken. As discussed above, this operable unit will not address soil remediation. This will be addressed in the subsequent RI/FS. Due to the limited scope of the RI/FS, which examined the threat to public health and the environment posed by the contaminated surficial aquifer, alternatives were formulated to achieve the following four goals:

- Minimize the potential for direct contaminant consumption;
- Control contaminant migration to the lower sand aquifer;
- Control contaminant migration to surface water; and
- Provide measures that will be consistent with the final site recommendations.

A comprehensive list of appropriate remedial technologies was identified for groundwater control. These technologies were screened based on the characteristics of the site and the characteristics of the contaminants. The technologies which survived the initial screening were further screened based on effectiveness, implementability and cost. Cost was only used between alternative technologies providing similar degrees of protection and treatment.

Technologies which satisfied the screening requirements were combined to form remedial action alternatives. Alternatives which could not guarantee consistency with future site work were dropped from consideration at this point in the evaluation process. The remaining alternatives ranged in scope from no action through complete lateral

containment of the surficial aquifer with groundwater extraction. The four alternatives developed are detailed below.

Alternative 1 - No Action

The no-action alternative is required by the National Contingency Plan (NCP) to be considered through the detailed analysis. It provides a baseline for comparison of other alternatives. Under the no-action alternative, no remedial measures would be undertaken at the South Andover site at the present time. The choice of the no action alternative at this time would not affect the U.S. EPA's and the MPCA's plans to perform a subsequent RI/FS at the South Andover site and is completely consistent with all future site work.

Alternative 2 - Alternative Water Supply

The alternative water supply alternative has the following three major components:

- Provide municipal water to private well users on or near the site;
- Monitor groundwater movement at the site; and
- Place restrictions on new wells on or near the site.

Connection to the municipal water supply would provide uncontaminated water to residences currently using their own private wells. Municipal water hookups would be provided to the eight residences sampled during the RI. Residential wells in both the surficial and lower aquifers will be properly abandoned to eliminate conduits for future migration of contaminants into the lower aquifer. This alternative would not affect future site work.

Groundwater monitoring will be used to detect lateral and vertical migration of contaminants. The monitoring will be coordinated with future site investigations. The well restrictions would eliminate the chance of new wells being installed in a contaminated aquifer.

Alternative 3 - Groundwater Extraction

The groundwater extraction alternative has the following four major components:

- Extract groundwater from the surficial aquifer;
- Provide municipal water to private well users on or near the site;
- Monitor groundwater movement at the site; and
- Place restrictions on new wells on or near the site.

The extraction wells would be located in or slightly downgradient of known contaminated groundwater areas. The wells would pump approximately 20 to 50 gpm (total). The extraction well system would control the horizontal migration of groundwater offsite and limit the vertical migration of contaminants into the lower aquifer by withdrawing the contaminated groundwater found in the surficial aquifer. The exact number and location of the wells will be determined during the remedial design process. Effects on the WDE extraction well system will be taken into consideration at this time.

The municipal water supply, groundwater monitoring, and restrictions on wells are the same as described in Alternative 2.

This alternative will not interfere with future site work. In addition, the gradients imposed by the extraction well system may be helpful in locating unknown areas of contamination.

Alternative 4 - Lateral Containment

The lateral containment option has the following five major components:

- Install a slurry wall around the site;
- Extract groundwater from the surficial aquifer;
- Provide municipal water to private well users on or near the site;
- Monitor groundwater movement at the site; and
- Place restrictions on new wells on or near the site.

This alternative incorporates all aspects of Alternative 3 with the addition of a circumferential slurry wall. The slurry wall will further limit horizontal groundwater contaminant migration and exclude clean water recharge from the surrounding aquifer. The entire site would be surrounded by the slurry wall which would average 30 feet in depth, 3 feet in width, and be approximately 5,800 feet long.

With a reasonable amount of coordination between the development of the workplan for the subsequent field work and the design of the slurry wall, this alternative should not affect future site work. This alternative, however, may limit future development to some extent.

Groundwater Discharge Options

Alternatives 3 and 4 involve groundwater extraction. It is necessary to provide for a discharge option for the extracted groundwater for both of these alternatives. Three possible discharge options were developed. The discharge options are as follows:

- Direct discharge to Coon Creek;
- Onsite treatment of groundwater with discharge to Coon Creek; and

- Discharge to the Metropolitan Waste Control Commission (MWCC) publically-owned treatment works (POTW).

The choice of groundwater discharge option will depend on preliminary work performed during the remedial design (RD) process. Information needed to make the final decision would include actual flow rates from the extraction wells, confirmation of the levels of acetone, methylene chloride and bis (2-ethylhexyl) phthalate present in the surficial aquifer, the National Pollution Discharge Elimination System (NPDES) permit requirements and possible interactions with the remedial action at the WDE site.

Direct discharge of the extracted groundwater to Coon Creek would require an NPDES permit. The NPDES permit sets specific contaminant discharge limits for the discharged waters. The discharge limits would be established by the State of Minnesota and would take into consideration the size and flow rate of Coon Creek, contaminant levels in Coon Creek from other sources and the uses of Coon Creek.

The levels of contaminants found in the surficial aquifer onsite currently exceed two of the proposed discharge limitations to Coon Creek provided by the MPCA. These compounds are toluene and bis (2-ethylhexyl) phthalate. The toluene level only exceeds the proposed discharge limitations in one monitoring well. The actual discharge level of toluene, when the discharge of all the extraction wells are combined, is expected to be below the discharge limitations. In this case, no treatment prior to discharging may be needed. The level of bis (2-ethylhexyl) phthalate significantly exceeds the proposed limitations, but has not been confirmed and may be a laboratory or sampling contaminant. The presence of this compound will be checked prior to determining the discharge option. The cost of the direct discharge is $160,000. A detailed breakdown of the cost is shown in Table 3.

If the NPDES discharge limits are exceeded by the extracted groundwater, onsite treatment of groundwater prior to discharging to Coon Creek would be provided as needed to meet proposed NPDES discharge limits established by the MPCA. A possible system was analyzed in the FS which would remove inorganic, volatile organic and base/neutral organic contamination through the use of an inorganic metal precipitator, an anthracite-greensand filter, an air stripper, and a granulated activated carbon system. This system is anticipated to meet a "best available technology economically achievable" criteria for the treatment of groundwater. Additional sample results during the remedial design may indicate parts of the system are unnecessary. This option would require significant operation and maintenance. Therefore, the maximum present worth cost of an onsite treatment system is $1,700,000. A detailed breakdown of the cost is shown in Table 3.

TABLE 3

COST SUMMARY

ASSEMBLED ALTERNATIVE	CAPITAL COST	REPLACEMENT COST	OPERATION & MAINT.	PRESENT WORTH
Alternative 1 NO ACTION	$0	$0	$0	$0
Alternative 2 ALTERNATIVE WATER SUPPLY	$65,000	$0	$48,000	$520,000
Alternative 3 GROUNDWATER EXTRACTION	$290,000	$50,100	$48,000	$760,000
Alternative 4 LATERAL CONTAINMENT	$3,000,000	$50,100	$48,000	$3,500,000

DISCHARGE OPTIONS	CAPITAL COST	REPLACEMENT COST	OPERATION & MAINT.	PRESENT WORTH
DISCHARGE TO COON CREEK	$160,000	$0	$0	$160,000
ON-SITE TREATMENT - DISCHARGE TO COON CREEK	$430,000	$32,000	$140,000	$1,700,000
DISCHARGE TO POTW	$26,000	$0	$31,000	$320,000

The discharge to a POTW option would entail sending the extracted groundwater to the MWCC wastewater treatment system. The onsite sanitary sewer lines could be used for this purpose. The MWCC POTW has adequate capacity and is in compliance with all of its discharge permits. The highest level for each of contaminants found in the surficial aquifer onsite meet the pretreatment limits for the POTW with the exception of acetone and zinc. The levels of acetone and zinc that will be present in the combined discharge of the extraction wells are expected to meet the pretreatment standards. The addition of the discharge stream is expected to have little if any effect on the MWCC treatment system due to the low contaminant levels and flow rates. The present worth cost for this option is $320,000. A detailed breakdown of the cost is presented in Table 3.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The four alternatives assembled were evaluated based on the following nine criteria:

- Overall protection of human health and the environment;
- Compliance with all federal and state applicable or relevant and appropriate requirements (ARARs);
- Reduction of toxicity, mobility or volume;
- Short term effectiveness;
- Long term effectiveness;
- Implementability;
- Cost;
- Community acceptance; and
- State acceptance.

A summary of the relative performance of the alternatives with respect to each of the nine criteria is provided in this section.

Alternatives 2, 3 and 4 would all be effective in protecting public health from ingestion and inhalation of the contaminants detected in the upper aquifer and possibly present in the lower aquifer. By providing municipal water to homes in the vicinity of the site, potential exposure to contaminated groundwater is eliminated. Additionally, Alternatives 3 and 4 provide a level of current and future protection to the environment by limiting contaminant migration offsite or into the lower aquifer through extraction of contaminated groundwater from the surficial aquifer. Alternative 2 does not provide protection to environmental receptors. Alternative 1 does not provide protection to human health or the environment.

Compliance with ARARs dealing with cleanup levels are not necessary for operable units. However, while the operable unit does not have to meet these ARARs, the final remedy will. Therefore, it is desirable that this remedy meet all ARARs.

The primary ARARs for this initial groundwater operable unit are the maximum concentration limits (MCLs) under the Safe Drinking Water Act (SDWA). MCLs are applicable where the water will be provided directly to 25 or more people or will be supplied to 15 or more service connections. MCLs are relevant and appropriate where surface water or groundwater is or may otherwise be used for drinking water. Alternatives 1 and 2 do not address the contaminated groundwater and, therefore, do not meet the SDWA ARARs. No reasonable grounds exist at the present time to justify a waiver of this requirement at the present time for Alternatives 1 and 2. Alternatives 3 and 4 meet the SDWA's MCLs by removing the contaminated groundwater in the surficial aquifer which has been found to exceed the MCLs. Also considered ARARs for the groundwater operable unit are the RCRA groundwater protection standards. These use background, MCLs or alternate concentration limits (ACLs) as the cleanup level. The criteria for choosing between background, MCLs and ACLs are detailed In 40 CFR Part 264.94.

Because the operable unit is being implemented for the purpose of controlling contaminant migration as opposed to restoring the surficial aquifer, the extraction well system will operate until the completion of the subsequent RI/FS regardless of future contaminant levels. Final cleanup levels will be established as a part of the subsequent RI/FS.

Additional ARARs, which are related to discharge options, would need to be met if either Alternatives 3 or 4 were chosen. These include the Clean Water Act, which covers discharges to surface water bodies, the Clean Air Act, which covers air emissions and POTW pretreatment requirements, which cover contaminant levels being discharged to a POTW. The relevant ARARs will be met by the discharge option chosen.

The criterion dealing with the reduction of toxicity, mobility or volume of contaminants only considers reductions due to treatment. Alternatives 1 and 2 do not incorporate any treatment. These alternatives, therefore, do not reduce toxicity, mobility or volume. Alternatives 3 and 4 would involve treatment if either the discharge to POTW option or the onsite treatment with discharge to Coon Creek option is chosen. Both of these discharge options involve treatment which would significantly reduce mobility and volume. If direct discharge to Coon Creek is choser, neither Alternative 3 nor 4 would involve treatment.

Alternatives 2, 3 and 4 provide a high degree of effectiveness in the short term in achieving prompt protection of human health with no significant adverse effects resulting from the implementation of the remedy. The hook-up to municipal water supplies would not require any significant time delays and is very effective in protecting the public from any potential risks due to consumption of contaminated groundwater.

Alternatives 3 and 4 are protective of the environment in the short term. The anticipated implementation timeframe may be somewhat longer for Alternative 4 due to the time required to design and construct a slurry wall. The no action alternative is not adequately protective of human health or the environment.

Alternatives 2, 3 and 4 are effective in providing long term protection of human health. The hook-up to municipal water eliminates the need to use groundwater on or near the site, but does not address the contamination present in the shallow aquifer or the threat to the lower aquifer. Alternatives 3 and 4 provide a moderate level of long term effectiveness with regard to protection of the environment by controlling contaminant migration. Neither Alternative 3 or 4 eliminates the downward flow gradient through the aquitard or removes contaminants already present in the aquitard, but both decrease the volume of downward flow from the surficial aquifer and the volume of contaminants present in the upper aquifer that pose a threat to the lower aquifer. Long term issues will be addressed more fully in the a subsequent RI/FS. The no action alternative is not adequately protective of human health and the environment.

The implementability of each alternative is based on the technical feasibility, administrative feasibility and the availability of services and materials for the alternative. All of the alternatives are technically feasible. They all involve technologies which have been used regularly in the past and have a demonstrated performance record. All of the alternatives are administratively feasible. Alternatives 3 and 4 would require obtaining a NPDES permit if a surface water discharge is used. Approval of the MWCC would be necessary if the POTW discharge is chosen for Alternative 3 or 4. Alternative 4 may require additional steps and time delays during design and in obtaining access and clearing junk automobiles from around the site prior to the construction of a slurry wall. The services and materials required for each alternative are expected to be readily available.

There are no costs associated with Alternative 1, the no action alternative. Alternative 2 has a total present worth cost of $520,000. Alternative 3 has a total present worth cost of $760,000. Alternative 4 has a total present worth cost of $3,500,000. Alternatives 3 and 4 would have the additional costs associated with the chosen discharge option. A summary of the costs for each alternative is provided in Table 3. Alternative 4 is not felt to offer significant increases in protectiveness to public health and the environment, short term effectiveness or long term effectiveness for the extra cost.

Limited comments were received from the community regarding the various alternatives considered. The comments received indicated the communities concern regarding the discharge options which were considered in the event a groundwater extraction alternative was chosen. These comments indicated a general opposition from the community, including

representatives from Anoka County, to a discharge to Coon Creek. Representatives from the City of Andover expressed concern regarding any discharge to the City's sewer system due to the volume limits set by the MWCC for the City and the resulting displacement of potential future development.

The State of Minnesota, through the MPCA, has been actively involved in the RI/FS process for the South Andover site. The MPCA concurs with the U.S. EPA's selected alternative. The selected alternative must be presented to Minnesota's Citizen Review Board prior to the State's commitment to fund 10 percent of the remedial action.

SELECTED ALTERNATIVE

Based on available data and analysis conducted to date, the U.S. EPA selects Alternative 3 as the most appropriate solution for meeting the goals of the initial groundwater operable unit at the South Andover site. The characteristics of Alternative 3 that are considered most important are:

- The alternative provides immediate protection to human health from the potential threats associated with consumption of groundwater from the site.

- The alternative limits migration of groundwater offsite and controls migration of contaminants into the aquitard and lower aquifers.

- The alternative provides for management of surface water quality through monitoring of contaminant levels in the surficial aquifer and possible surface water discharges.

- The alternative is consistent with additional site actions and will be compatible with the final site remedy.

Clean-up Levels

The initial groundwater operable unit is being implemented for the purpose of controlling contaminant migration not restoration of the surficial aquifer to drinking water standards. Therefore, no cleanup levels are being established at this time. The extraction system will operate until the completion of the subsequent RI/FS. At that time, the groundwater operable unit will be incorporated into the overall site remedy and clean-up levels will be set. The levels to be set are expected to meet all Federal and State ARARs.

Due to the discontinuous and possibly intermittent nature of the contamination, continuous extraction of the groundwater would provide a more reliable migration control system than one which would pump only

when analytical data indicates a contaminant specific or risk specific action level was exceeded. The continuous extraction is also supported by the predominately downward gradient which exists through the aquitard. By increasing the horizontal gradient through the remainder of the study, the chances of capturing contaminants, prior to them entering the aquitard, is increased.

A second important advantage of continuous extraction is that extraction could significantly aid the subsequent RI in locating potential sources of contamination. Previous efforts, using monitor wells and soil gas analysis, did not locate any source areas of high concentration in groundwater or soil. The gradients caused by the extraction wells will potentially draw in pockets of high contamination and facilitate the pinpointing of the source areas.

Operation and Maintenance

The recommended alternative requires a certain degree of annual operation and maintenance (O&M) activity to ensure that groundwater will be extracted and treated to meet the clean-up levels. The degree of O&M cannot be determined until the discharge option is selected. Direct discharge to Coon Creek and discharge to the POTW would both require monitoring of the discharge contaminant levels. An O&M plan will need to be developed during remedial design after the groundwater discharge option has been chosen.

A groundwater monitoring plan will also need to be developed and implemented to determine if contaminants have migrated offsite or into the lower aquifer. This can be incorporated into the subsequent RI/FS work planned for the site.

All O&M responsibilities will be covered as specified in Section 104(c) of SARA. The O&M plan will be reviewed at the completion of the subsequent RI/FS and be incorporated into the final remedy.

STATUTORY DETERMINATIONS

The U.S. EPA and MPCA believe that this remedy will satisfy the statutory requirements of providing protection of human health and the environment, attaining applicable or relevant and appropriate requirements of other environmental statutes, will be cost-effective, and will utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The choice of discharge option for the extracted groundwater will determine whether this operable unit will satisfy the preference for treatment as a principal element.

Protection of Human Health and the Environment

The selected remedy provides adequate protection of human health and the environment by preventing consumption of contaminated groundwater through the provision of an alternate water supply, limiting offsite migration if contaminated groundwater and protecting the deeper aquifer from becoming contaminated by the implementation of a groundwater extraction system.

Additional controls on exposure are achieved through restrictions on new wells on or near the site and through monitoring of groundwater at the site.

Attainment of Applicable or Relevant and Appropriate Requirements

This remedy will ensure that drinking water to be supplied to current private well users will attain MCLs under the SDWA and that the discharge from the groundwater extraction system will meet NPDES limitations under the Clean Water Act if discharged to Coon Creek.

Cost-Effectiveness

This alternative affords a high degree of overall effectiveness in not only protecting existing well users against exposure to contaminated groundwater through the provision of an alternate water supply, but also in halting further migration of the contaminated groundwater offsite and into the lower drinking water aquifer through the extraction system. The present worth cost of this action will range from $920,000 to $2,460,000 depending on the discharge option selected during design. This compares with the $3,500,000 required to construct a slurry wall around the site. U.S. EPA believes the costs of the selected remedy are proportionate to the overall effectiveness it affords such that it represents a reasonable value for the money.

Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

U.S. EPA believes this remedy is the most appropriate solution for meeting the goals of the initial groundwater operable unit at the South Andover site providing the best balance among the evaluation criteria for the alternatives evaluated. This remedy provides effective protection in both the short- and long-term to potential human and environmental receptors, protects the deeper aquifer from becoming contaminated, is readily implemented, is cost effective and is consistent with future response actions that may be undertaken at the site.

Preference for Treatment as a Principal Element

Due to the limited scope of this remedy, which is not the final response action for any of the principal threats posed by the site, the statutory

preference for treatment may not be met. The choice of discharge option during design will determine if the preference is achieved. Subsequent actions are planned, however, that will definitively address the principal threats.

SCHEDULE

The remedial action start is one of the 175 sites comprising a statutory goal for remedial action starts by October 1989. The following are the key milestones for implementation of the remedial action in the event that RD/RA negotiations are not successful.

Approve Remedial Action (execute ROD)	March 1988
Initiate Remedial Design	June 1988
Complete Remedial Design	June 1989
Initiate Remedial Action (Award Contract)	September 1989

FUTURE ACTION

A detailed study of a large portion of the site was impossible due to the large volume of tires and junk automobiles present onsite. The tires are currently being shredded onsite and sent offsite. The operation is taking place under a grant from the Minnesota Waste Management Board and is scheduled to be completed by Spring 1989.

A subsequent RI/FS is planned for the site following the tire removal. The subsequent RI/FS will study and determine appropriate final groundwater remediation and source control measures.